



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

1914, this material having been grown from specimens sent from Austin, Texas, by Dr. M. S. Young, in February, 1914. A photograph of sterile specimens from the same culture was published in the former number of THE BRYOLOGIST (17: 72).

NEW YORK BOTANICAL GARDEN.

## NOTES ON THE SURVIVAL OF EXTREME DROUGHT BY CERTAIN MOSSES

F. L. PICKETT

Bloomington is in the middle southern portion of Indiana, in the limestone region. For three or more miles in any direction the town is surrounded by rough country, hills and valleys and many narrow ravines, where the underlying stone is only partly hidden by a light layer of clay. This area was formerly covered with hardwood timber, but this has mostly been cut away, and the portions not fit for cultivation and grazing are covered with second growth timber and underbrush. These partly sheltered hillsides are favorite fields for many of the common mosses, especially those growing on soil and exposed stone. The following forms are found in abundance, especially on south and southwest exposures: *Polytrichum commune*, *P. Ohioense*, *Dicranum scoparium*, *Dicranella heteromalla*. A little more under the timber *Catharinaea undulata* and *Leucobryum glaucum* are common. On the exposed rocky points may always be found *Grimmia apocarpa*, *Orthotrichum Lescurii*, *Rhytidium rugosum* and *Hedwigia albicans*. Common on trees in the same localities are *Leucodon julaceus*, *L. brachypus*, *Forsstroemia trichomitria* and *Drummondia clavellata*. On the bases of the same trees the familiar mats of *Anomodon attenuatus* and *Thelia hirtella* are common. In moister, shaded places on the hill-sides *Bartramia pomiformis* and *Aulacomnium heterostichum* are abundant. All these forms except *Leucobryum glaucum* and *Rhytidium rugosum* are regularly found freely fruiting in season.

The summer of 1913 was marked by unusually severe weather conditions. March 23-27 was a flood period with 9.2 in. of rainfall. Then up to April 30 further rainfall amounting to 5.14 in. kept things in good condition. But from May 1 to September 11 only 8.7 in. of precipitation was recorded. During this time periods of specially severe conditions should be noted. There was but .53 in. of rainfall during May, 2.14 in. between May 28 and July 11, and 1.25 in. between July 25 and August 21. The slight rainfall of the summer was scattered through many short showers, mostly less than .5 in. and many between .1 in. and .15 in., leaving scarcely a trace of moisture when they had passed. Along with the drought high temperatures prevailed, as shown by the following abstract from the record of the U. S. W. B. station at Bloomington.

	Maximum	Mean maximum
May	95° F.	77.9° F.
June	103°	89.7°
July	107.5°	94°
August	101°	91.8°
September, up to 12	102°	95°

The temperature on south slopes exposed to, or, at most, but slightly protected from, the direct rays of the sun by scattered trees and bushes, was 20° to 25° higher than the above record.

The effect of such conditions on all forms of vegetation was clearly marked, but that shown by the moss flora has been of special interest to the writer. Spring fruiting mosses matured very few capsules, and the later forms promptly dried up. By the first of June all the moss beds not in places having a constant water supply had the appearance usually found in late August or September. This dead appearance continued up to and through the winter, and, in some cases, was quite noticeable in the spring of 1914. The summer and fall fruiting forms, except in most favorable localities, did not fruit in 1913. A noteworthy exception to the condition just stated was presented by *Leucodon julaceus* and *Forsstroemia trichomitra*, both of which were found fruiting abundantly in exposed places in the fall and winter of 1913.

Frequent examinations of the principal moss areas in the neighborhood have been made up to June, 1914. The findings with reference to the commoner forms are given below:

*Leucobryum glaucum*. A few dead plants found in most tufts, vigorous growth in 1914.

*Polytrichum commune* and *P. Ohioense*. The patches show 50-75% of plants dead, with many others inactive except in the production of new shoots from the base. Fruit or sex organs very rare in 1914.

*Dicranum scoparium*. Vegetative portions uninjured, fruit scarce, and capsules imperfectly formed in 1914.

*Grimmia apocarpa*. Uninjured except in the case of tufts on wholly exposed stones in walls, in which places some patches showed all plants dead. Most tufts show abundant fruit and vigorous growth in 1914.

*Orthotrichum Lescurii*. Uninjured and fruiting abundantly in 1914.

*Rhytidium rugosum*. Uninjured.

*Dicranella heteromalla*. Many dead patches with no new growth in exposed places, vigorous growth and abundant fruit where protected in shallow gullies.

*Bartramia pomiformis*. Very light crop of sporophytes in 1914, with many capsules dwarfed or sterile. Vegetative portions uninjured, but showing only slight growth.

*Aulacomnium heterostichum*. Uninjured and fruiting abundantly.

Tree growing species were uninjured almost without exception, although *Anomodon attenuatus* did not fruit and *Thelia hirtella* produced but few capsules in 1913. The lowland forms show the effect of drought by the presence of few fruiting or sexually mature plants, which conditions are noticeable again in 1914.

Of special interest locally is the effect of this dry summer on the two species of *Polytrichum* and on *Dicranum scoparium*. Already, midsummer, 1914, the silky tufts of the *Dicranum* are prominent among the dead *Polytrichum* plants which almost hid them before. Before the injured forms can regain their vigorous growth the *Dicranum* will have usurped most of their territory.

INDIANA UNIVERSITY, BLOOMINGTON, IND.